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EXAMINER

RUTHKOSKY, MARK

ART UNIT

PAPER NUMBER

1745

DATE MAILED: 06/05/2002

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Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/700,157

Applicant(s)

GRATZEL ET AL.

Examiner

Mark Ruthkosky

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10 November 2000.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 November 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All   b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                  | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input checked="" type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)              | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>4</u> . | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Priority***

Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). This application is a 371 of PCT/ EP99/03261. The certified copy of EP 98810431 filed 5/12/1998 has been filed in PCT Application No. PCT/EP99/03261, filed on 5/8/1999.

### ***Information Disclosure Statement***

The information disclosure statement filed 11/10/2000 has been placed in the application file, and the information referred to therein has been considered as to the merits.

### ***Drawings***

The drawings are objected to as noted on the attached PTO-948, Notice of Draftsperson's Patent Drawing Review. Correction is required.

### ***Claim Objections***

1. Claims 1-16 are objected to because of the following informalities: The claims do not include transitional phrases commonly used in United States practice. The term "characterized in that," as used in the instant application, does not clearly define the scope of the claim as compared with the phrases "comprising" and "consisting of" which have well understood meaning in U.S. practice. Appropriate correction is required.

*Claim Rejections - 35 USC § 112*

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, the terms "high capacity" and "high power density" are relative terms, which render the claim indefinite. The terms are not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Claim 1 includes an improper Markush group. A proper Markush group should read, "selected from the group consisting of" and where the group is closed by the word "and." The variables x and y in the formulae are not defined for each compound in the claim. The phrase "glass forming metallic elements" is indefinite as it is not clear what elements are glass forming. These materials are not defined or described in the specification.

In claim 2, there is no antecedent basis for the phrase, "mesoporous electrode" in claim 1. Further, the last 5 sentences state that the morphology is designed to overcome impediment of ionic diffusion. This limitation is indefinite as it is not clear from the claim or the specification how the morphology is designed or what the structure of this design encompasses.

In claim 5, there is no antecedent basis for the phrase "the small dimension."

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In claim 6, there is no antecedent basis for the phrase, “the particle.” Further, the phrase “in order to exert control over the texture...” is indefinite as it is unclear what control is imposed over the material or how it is accomplished. There is no antecedent basis for “oxide precursor grains.”

In claim 7, the material is comprised of mesoporous 5-20  $\mu\text{m}$  beads or rods. It is unclear if 5-20 defines the mesoporous structure or the beads. Further, it is unclear if the dimension is for the diameter or length of the rod. The phrase “in the form of pellets or films” is indefinite, as it appears to be a misspelling. The phrase “or other matrix” is indefinite as it is not clear as to what defines a matrix or the identity of such a matrix. The phrase “and/or” is indefinite as it is not clear if the what elements are required, as shown by “and,” and what are not, as shown by “or.” The phrase, “and long enough time” is indefinite as it is not clear what is happening for this time; heating, drying, or conversion? The phrase, “desired state” is indefinite as it is not clear what state is desired, dryness, a specific temperature?

In claim 9, there is no antecedent basis for an alkali metal. Claims 9 and 10 include improper Markush groups. A proper Markush group should read, “selected from the group consisting of” and where the group is closed by the word “and.”

In claim 11, there is no antecedent basis for “the lithium ion containing salt.” Regarding claim 11, the phrase “such as” renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

In claim 12, there is no antecedent basis for “the alkali or alkaline earth metal.”

In claim 14 there is no antecedent basis for “the negative electrode” or “the positive electrode.”

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In claim 15, the material is comprised of mesoporous 5-20  $\mu\text{m}$  beads or rods. It is unclear if 5-20 defines the mesoporous structure or the beads. Further, it is unclear if the dimension is for the diameter or length of the rod. There is no antecedent basis for "secondary mesoporous particles." The term "secondary" is indefinite, as the claims and the specification do not provide definition for "secondary." Further, the processes of templated-ordering, manipulative stacking or arrangement that controls particle orientation is indefinite as the specification does not provide meaning for these processes nor does it provide a resultant structure. The phrase "by treatment" is indefinite as it is not clear what defines "treatment." The use of parentheses renders the claim indefinite because it is unclear whether the limitations in parentheses are part of the claimed invention.

In claim 16, there is no antecedent basis for a separator. The phrase "such as" renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d). The use of parentheses renders the claim indefinite because it is unclear whether the limitations in parentheses are part of the claimed invention. The claim includes improper Markush groups. A proper Markush group should read, "selected from the group consisting of" and where the group is closed by the word "and." The abbreviation DSA is not defined. The claim also includes multiple sentences. The last sentence appears to be missing elements to form a complete sentence.

The applicant is encouraged to thoroughly review the claims for misspellings and additional indefiniteness issues. The claims will be examined as best understood by the examiner.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-2, 4, 8-10, 12 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Frech et al. (US 5,958,624.)

The instant claims are to a electrochemical generator having two electrodes connected together by an electrolyte, wherein one of the electrodes includes an oxide or chalcogenide of a specific structure having a pore size of 0.001 to 10 microns and a specific surface area between 2 and 2000 m<sup>2</sup>/g.

Frech et al. (US 5,958,624) teaches a battery incorporating a meso-structural metal oxide material. The battery has two electrodes connected together by an electrolyte (column 9.) The electrodes have a pore size of 2-20 nm, which falls in the range of 0.001 to 10 microns and a specific surface area of 650 to 1400 m<sup>2</sup>/g, which falls in the range between 2 and 2000 m<sup>2</sup>/g (see claims 1-6; it is noted that 0.001 micron is 1 nm.) Various compounds are noted including lithiated metal oxides. Meso-structured tin and iron oxides are noted in col. 9, lines 15-25 and example 2. The generic formula of claim 1 of the reference also reads on the structure SnM<sub>x</sub>O<sub>y</sub> where M is a glass-forming element. Other cathode materials including MnO<sub>2</sub> are noted in col. 9 and example 2. With regard to claim 2 and 12, the materials are mesophased structures with interconnected pores to intercalate lithium ions (col. 9, throughout the reference.) With regard to claims 8, 9 and 10, electrolyte materials are described in col. 9, lines 30-50.) With regard to

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claim 16, inorganic and polymeric electrolytes, which act as insulating separators are disclosed in col. 9, lines 45-50 and in example 1. Current collecting conductive matrices are described in example 1. Thus, the claims are anticipated.

The product-by-process claim 4 is anticipated. The process of claim 4 is taught in col. 6, where precursor materials are reacted with surfactant materials in aqueous solutions (see lines 5-25.)

***Claim Rejections - 35 USC § 102/103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 3 and 6 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Frech et al. (US 5,958,624).

The teachings of Frech et al. (US 5,958,624) have been provided. Claims 3 and 6 are product-by-process claims. Frech et al. (US 5,958,624) does not teach the exact process steps of claims 3 and 6. The products of Frech et al. (US 5,958,624), however, anticipate the products of the instant application. It would be obvious to one of ordinary skill in the art at the time the invention was made to prepare the product as the courts have held for similar products, product-by-process limitations are obvious, In re *Brown*, 173 U.S.P.Q. 685, In re *Fessman*, 180 U.S.P.Q. 324.



***Claim Rejections - 35 USC § 103***

8. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Frech et al. (US 5,958,624) as applied, and further in view of Green et al. (US 6,245,847.)

The teachings of Frech et al. (US 5,958,624) have been provided. Frech et al. (US 5,958,624) does not teach the electrolyte to include a molten solvent. Green et al. (US 6,245,847), however, teaches electrolyte compositions for lithium cells which include molten salts for the lithium ion containing salts (column 1.) The examples include various molten salts including EMI in example 3. It would be obvious to one of ordinary skill in the art at the time the invention was made to include a molten electrolyte salt as taught by Green et al. (US 6,245,847) in the battery of Frech et al. (US 5,958,624) as the electrolyte will provide at equivalent means of transporting ions as the lithium ions salts provided in the battery while minimizing leakage and flammability as taught by Green et al. (US 6,245,847.)

***Allowable Subject Matter***

9. The following is a statement of reasons for the indication of allowable subject matter: Claims 5, 7, and 13-15 contain allowable subject matter. The prior art does not teach the materials as claimed, such as TiO<sub>2</sub>, with specific particle sizes and aspect ratios. Due to the claim rejections under 35 U.S.C. 112, it is difficult to ascertain the scope of the claims, however, the prior art does not appear to discuss specific particle sizes and aspect ratios with respect to the compounds of the instant claims *as currently understood by the examiner.*

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***Examiner Correspondence***

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1193. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark Ruthkosky whose telephone number is 703-305-0587. The examiner can normally be reached on FLEX schedule (generally, Monday-Thursday from 9:00-6:00.) If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached at 703-308-2383.

The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Mark Ruthkosky  
PATENT EXAMINER  
Art Unit 1745  
5/30/02